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ABSTRACT

Interactive computer networks, long available to members of the scientific and business communities, now are being introduced by departments and schools of education to enhance and continue the education of teachers. Electronic networking, linking beginners with other beginners and with their former university-based teacher educators, provides a new medium of support for beginners. One such network is the Beginning Teacher Computer Network at the Harvard Graduate School of Education. This electronic network offers support and direction to novice teachers in disparate geographic locations during their first year of teaching. This study examines the following questions: (1) What is gained or lost by substituting for face-to-face interactions a system involving telephone lines and electronic equipment? and (2) What influence does the referent of multiple teaching contexts represented by the novices on the network have on the articulation of concerns and the development of strategies and solutions to problems? These questions form the foundation for a deeper understanding of the influence of electronic networking on induction support and the potential of this medium to encourage and foster reflection in beginning teachers. (Author)

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Research Report 90-9

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Katherine K. Merseth

NCRTE

National
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Abstract

Interactive computer networks, long available to members of the scientific and business communities, now are being introduced by departments and schools of education to enhance and continue the education of teachers. Electronic networking, linking beginners with other beginners and with their former university-based teacher educators, provides a new medium of support for beginners. In this paper, the author presents research related to the Beginning Teacher Computer Network at the Harvard Graduate School of Education. This electronic network offers support and direction to novice teachers in disparate geographic locations during their first year of teaching. In particular, she examines the following questions: First, what is gained or lost by substituting face-to-face interactions with a system involving telephone lines and electronic equipment? And second, what influence does the referent of multiple teaching contexts that are represented by the novices on the network have on the articulation of concerns and the development of strategies and problem solutions? These questions form the foundation for a deeper understanding of the influence of electronic networking on induction support and the potential of this medium to encourage and foster reflection in beginning teachers.

BEGINNING TEACHERS AND COMPUTER NETWORKS: A NEW FORM OF INDUCTION SUPPORT[1]

Katherine K. Merseth[2]

Interactive computer networks, long available to members of the scientific and business communities, now appear with increasing frequency in higher education. Conferencing systems, such as BITNET, USENET and others supported by large university mainframe computers, effortlessly provide a means for members of most university communities to communicate quickly and efficiently with colleagues across the nation and around the world. This networking capacity has spread to some elementary and secondary schools, linking children and teachers on selected projects.[3]

While the notion of computer conferencing for educational purposes is not new (Kerr and Hiltz, 1982; Riel, 1986), the use of interactive computer networks by departments and schools of education to enhance the education of teachers remains relatively rare. Two institutions that provide access to the networks of large mainframe university computers for education students, faculty, and school site practitioners are the University of Virginia (Bull et al., 1989) and the University of Michigan (Interactive Communications and Simulations, 1990). In both instances, these systems link currently enrolled students, either in student teaching placements or course work, with supervisors, cooperating teachers, and university faculty members. At the Harvard Graduate School of Education, a specially tailored network called the Beginning Teacher Computer Network offers support and direction to novice teachers in disparate geographic locations during their first year of teaching. Unlike the other university-based networks, the support of novice teachers during induction is the sole objective of this system.

Electronic Networks and Teacher Induction

The availability of computer networks that link individuals in different institutions and geographic locations offers unique opportunities to university faculty concerned about the induction of new teachers to the profession. A teacher's first year in the classroom, away from the university, is often characterized by stress and self-doubt (Lortie, 1966; Odell, 1986). Issues of isolation, classroom management, motivation, individual student differences,

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[1]This paper was presented at the annual meeting of the American Educational Research Association in Boston in April 1990.

[2]Katherine K. Merseth is director of the Comprehensive Teacher Education Institute at the University of California-Riverside.

[3]For example, the Alaska Quill Project links students in rural Alaska while KIDSNET enables elementary students across the country to compare data on acid rain (see Riel, 1986).

and the personal exigencies of teaching abound in the research literature and in personal accounts of teaching (Ryan et al., 1980; Shulman and Colbert, 1988; Veenman, 1984). Newly minted teachers enter the profession armed with enthusiasm, idealism, and a teaching certificate. In many instances, they have little else to sustain them during their first year.

Educators and state policymakers, noting the significant attrition of beginners and the mounting need for new teachers in some regions of the country and in certain subject areas, now encourage the creation of formal induction programs to support beginning teachers (Darling-Hammond and Berry, 1988; McLaughlin, 1986; Varah, Theune, and Parker, 1986). Prominent examples of such programs include the Ohio American Federation of Teachers Toledo Plan, the California New Teacher Program, and the Connecticut Beginning Teacher Program. Often these induction programs are locally based and support graduates from many different teacher education programs.

Perhaps due to the diverse teaching locations of participants, induction programs rarely build directly upon the teachers' prior experience in preservice education; instead, the foundation established during initial training is ignored. Indeed, a recent study of 1,600 teacher education institutions indicated that only one in five participated in any formal induction program (Johnson and Kay, 1987). If preservice programs are effective, then knowledge of the perspectives, philosophies, and conceptual orientations of these programs should have a powerful impact on the form and substance of support offered through induction programs. This suggests that institutions of higher education and their education departments have a unique and important role to play in the provision of support to beginning teachers (Howey and Zimpher, 1987).

Prior to the advent of interactive computer networks, it was difficult, if not impossible, to link graduates from the same preservice program during their first year of teaching. The diverse geographic locations of graduates coupled with differing teaching schedules and significant time demands for the new teacher militated against common meetings or program activities. However, the proliferation of computers in the nation's schools (98.8 percent of all public middle and high schools use microcomputers, for example), combined with recent advances in telecommunications, now offer a means to overcome the geographic and institutional barriers that have constrained induction program design. Electronic networking, linking beginners with other beginners and with their former university-based teacher educators, provides a new medium of support for beginners.

How Electronic Networks Work

A network is a term used to describe the electronic transfer of text messages from one person to another or to a group of individuals. The common form of exchange is as printed text on a computer screen, although some business applications now employ video as well as text messages. Participants on a network use personal computers which are linked

through modems and telephone lines to reach a host computer. While large networks use mainframe computers as the host, recent technical advances allow personal computers, such as the IBM XT or Digital Rainbow, to serve as the host (Hancock, 1985). This development greatly simplifies the implementation of a network and frequently reduces complications and confusions resulting from the complexity of multipurpose mainframe computers.

In some networks, members only have the capacity to send and receive private, confidential messages. This type of a system is commonly called e-mail. The host computer stores the messages for a user and awaits the calls of the network members to read the messages and to send other messages. Other networks offer public "bulletin boards" or "forums" where users read and send messages on topics of general interest. In this instance, the messages are public and available for all users to read. Often these forums are the site of active discussions and debate. Some networks offer both private and public mail systems. All messages, whether they are private or public, identify the sender, the date they are sent, and include a referent line (provided by the sender) indicating the content of the message.

Research Issues

Current research on learning to teach (Feiman-Nemser, 1983; Zeichner and Gore, 1988) points strongly to the need for support and guidance of beginning teachers. Recognizing this, many local and state agencies have mandated formal teacher induction programs that have spawned the development of a relatively new body of research on teacher induction programs and practices (Huling-Austin, 1989). The range in design of induction programs is enormous, depending upon the particular program goals (Huling-Austin, 1986) and contexts (Parker, 1990; Feiman-Nemser, 1990) in which they are used. As programs develop and evolve to address this need, continuing research will provide important information for policymakers about the impact of different program designs and approaches.

The introduction of interactive computer networking in induction programs not only offers a unique form of support for beginning teachers during induction, but it also provides a new perspective for the research on teacher thinking. Because the network electronically captures and records the reflections of novice teachers, it offers an unusual window into the thinking, decisions, and concerns of first year teachers (Beals, 1990). In particular, the availability of these data fosters an examination of important questions including: What do beginners, participating voluntarily and initiating topics themselves, elect to discuss (Merseth, 1989b)?[4]

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[4]Research related to this topic is currently underway at the Harvard Graduate School of Education with support from the Hitachi Foundation (Merseth, 1989b).

Before this line of research can be explored in depth however, questions related to the nature of the medium must be answered. These answers will serve as a foundation for a more complete understanding of the influence of this form of induction support. Questions that will lead to this understanding focus on the influence of the conveyances--in this instance, computer screens and telephone lines--and on the unique context created by the network. Specifically, these considerations generate the following questions: First, what is gained or lost by substituting face-to-face interactions with a system involving telephone lines and electronic equipment? And second, what influence does the referent of multiple teaching contexts present on an interactive computer network have on the articulation of concerns or problems and the development of strategies and problem solutions by novices? These questions and their answers will form the foundation for a deeper understanding of the influence of electronic networking on induction support. In addition, they lead to other important research related to the potential of electronic networking as a medium to encourage and foster reflection-on-action (Schön, 1987) in beginning teachers.

Methodology

To examine these questions, a study was conducted of the Beginning Teacher Computer Network (BTCN) at Harvard University. This electronic network is designed to provide induction year support for graduates who received masters degrees in education and teacher credentials. Thirty-eight graduates of three specific teacher education programs at Harvard University participated on the network during the 1987-1988 academic year. A similar number of new teachers have participated on the network for each of the 1988-89 and 1989-90 academic years.

All of these cohorts of beginning teachers have been joined by two university faculty members, one teacher education program administrator, one graduate student assistant (an experienced teacher) and occasional invited "experts." Network members teach in middle and high schools across the United States and use personal computers either in their schools or homes to communicate with each other; a toll-free telephone number was established to defray participant costs.[5] On the BTCN, participants have private message capacity as well as access to public bulletin boards. The public bulletin boards include the following topical headings: math, science, language arts, social studies, management, evaluation, policy,

[5]The network received initial support for its creation from the IBM corporation. The Beginning Teacher Computer Network is currently in its third year of operation with a new cohort of first-year teachers using the system each year. The host computer is an IBM XT with 640 RAM and a 20-mg hard drive. The host modem is a Hayes Smart Modem, 1200 Baud. The remote computers used by the participants include IBM PC Jr's, IBM compatibles, MacIntoshes (all models) and Apples. The host conferencing software is Common Ground developed and available from the Educational Technology Center, Harvard Graduate School of Education, Gutman 337, Cambridge MA 02138 for $30. The software will run on any DEC or IBM compatible with 640K RAM and at least two floppy drives; hard drive not required. Remote software is public domain software including Red Ryder, PCTalkIII and Bitcom.

computer technical information, and general (for topics of general interest that do not seem to fit elsewhere).

Three types of data were collected for this study: process data, product data, and participation data. The process data resulted from a survey of the first cohort conducted in the Spring of 1988. In this survey, participants were asked about their use of the network and its effectiveness in meeting their needs as beginning teachers.[6] Additional process data were gained from follow-up structured interviews with first-year program participants who were selected to vary by participation rate.[7] Product data consisted of the 4,200 public messages sent by the network participants during the 1987-88 academic year. Using a coding scheme developed by Cutler (1990), these data were coded and analyzed to determine the nature of support and the influence of multiple contexts on the advice given. Participation data were derived from computer counts of message numbers and telephone usage, and self-reports in the survey.

Findings and Discussion

One important component of teacher induction programs is the provision of support for the beginning teacher (Huling-Austin and Murphy, 1987; Odell, 1989; Odell, Loughlin and Ferraro, 1987). Some researchers, who have reported positive outcomes from providing personal and emotional support to new teachers, stress that emotional support may be more important than other activities because, without emotional stability, beginners will have difficulty addressing other instructional concerns (Brooks, 1987; Hoffman and Leak, 1986; Huling-Austin, 1989). Unfortunately, this form of support is rare in induction programs (Odell, 1986).

The Supportive Capacity of Networks

How likely is it that a computer network, with keyboards, computer screens, and telephone lines will encourage discussions that impart personal and emotional support? If one accepts the notion that the nature of the medium heavily influences the message (McLuhan, 1964), then it seems likely that computer networking will manifest itself in cold, impersonal interactions because of its technical and mechanical nature. The data however, do not support this hypothesis.

Both interview and survey results indicate that the nature of the network did not adversely affect its ability to provide emotional support to the novices. Participants indicated

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[6]This survey was mailed to participants and had an 84 percent response rate. It is referred to as survey data.

[7]Structured interviews were conducted individually during the Spring 1990. Respondent comments are referred to by transcript page and with initials to protect confidentiality. The protocol was pilot tested with one member of the second cohort before being used with 6 members of the first cohort.

in interviews that prior to their participation, they anticipated that the network would dispense facts and answer questions about lesson plans and textbooks. To their surprise, the network fostered "conversations" and "philosophical discussions." One teacher, teaching in a private school in a large city, noted:

> I thought it would be a place to get advice after bad days or to share ideas about how to teach a common lesson. . . . I think I expected a whole lot more of just practical advice than the philosophical discussions that seemed to erupt on the network. (JB, p. 4)

In addition to the semistructured interviews, all network participants were asked at the conclusion of the academic year to rate the effectiveness of the BTCN with regard to a number of objectives (see Table 1). "Receive moral support" garnered the highest rating of the objectives while "Get help with lesson plans" ranked among the lowest.

One factor that enhanced the ability of the network to provide emotional support was its convenience. Because the BTCN was available at any hour of the day or night for writing and reading about teaching experiences, it offered a place where busy beginning teachers could connect at their convenience with colleagues. No matter when the beginner logged on to the system, there usually were messages waiting to be read from colleagues and a blank screen yearning for thoughts about the day or recent experiences. As one participant noted, "It's easier to schedule the computer, which is significant. I can do it at 3:00 in the morning if I want" (TC, p. 17).

Other participant self-report data indicate that the connectedness afforded by the BCTN tended to reduce the feelings of isolation and loneliness. One novice observed: "In general, I remember feeling gratified that we all faced similar problems and had similar questions. I found that very supportive." Another first year teacher stated: "Hearing about other people's problems made me feel less alone. Those conversations . . . let me know it wasn't just me" (Survey data, 1988).

In turn, this connectedness helped reduce feelings of isolation. While researchers know that many first year teachers will experience a remarkably similar set of concerns regardless of their school or classroom location, novices often do not have this perspective. They frequently feel that they are the "only ones" with discipline or management questions or worries about student motivation. The isolation experienced by first year teachers can be the result of full schedules and overwhelming work loads. A first-year teacher described this reality:

> As a new person, I was also really busy just setting up the curriculum. . . . So that my workday time was full and by the time I was done and ready to relax, most people had left--there was no one [at the school] to talk to. (MD, p. 2)

The challenge for those designing induction programs is to provide interaction with colleagues in the face of significant scheduling and time constraints during or after the school day. Interactions with others can reduce feelings of isolation and provide support. In particular, with beginning teachers,

> The chance to interact with a colleague by asking questions, sharing materials, or planning collaboratively has other benefits of an emotional nature. The beginning teachers sense this support from the helping or nurturing attitudes of their colleagues and depend upon it to get them through those first, difficult, lonely months. (Wildman, Niles, Magliaro, McLaughlin, and Dill, 1987, p. 12)

A second factor that contributed to the ability of the network to provide support to the beginning teachers was its privacy or confidentiality. Access to network messages was only available to beginning teachers and selected program faculty who were participants on the BTCN. Novices often are uncomfortable with those in supervisory positions (Fox and Singletary, 1986). This leads Henry (1989) to argue: "It is evident on the part of those who have had experience in teacher induction that there is benefit in having a support person who is not responsible to the governance of the school" (p. 76).

While this research does *not* argue for the exclusion of locally based support and mentoring programs, these findings do suggest that the "at-distance" aspect of the system offered a safe forum for beginning teachers to discuss their school sites with candor. The confidentiality of the network as well as the prior relationships developed in the preservice teacher education program encouraged honest and frank conversations. One novice, teaching in a rural school with an unpopular department chair, noted,

> It was just a haven where you could talk about these things. You could ask questions that you wouldn't ask at your school. It might be too inflammatory. What do you do if the department head's a jerk? You can't really ask that at school, 'cause it might get back to the wrong person. (TC, p. 25)

In addition, "asking for help" from colleagues who were not in supervisory positions may have been easier for those on the network because the beginner did not risk being perceived as weak or ineffective. This was a serious concern for some of the network members:

> msg. no. 2512 filed 2:01 PM Feb.12, 1988
> to: general

from: Rob[8] in Massachusetts
re: asking for help

I'm a bit paranoid about how it looks to the department head or administrator I ask for help. Do I risk looking bad in their eyes, when they are the ones who make the decision whether or not to hire me for next year? While I realize that they can appreciate the difficulties of a first year teacher, does it not somehow lower their view of me as a good teacher if I keep going to them for help?

msg. 2583 filed 10:31 pm Feb 18, 1988
to: general
from: Peter in Connecticut
re: getting help

Rob's comments about job security hit home. Although I wish it was not the truth, I often think about how I appear to my dept. head or principal before I communicate with them. RIFing is a real fact. I don't know how much their perceptions of me will effect those job decisions.

If the beginning teachers thought that their questions would be treated either as a sign of weakness or something that they should "already know," they reported feeling more comfortable asking for help on the network than at the school site. One teacher compared asking for help at her school site to asking for help on the network:

> I certainly would not have been calling those people on the phone when I got home from school. Definitely not. Also, it's . . . a safe way to communicate with people. You don't really have to deal with them. You can sit down and read what you want to read of what's coming on the screen, and kind of phase out what you don't want to think about. It's a very unpressured way to communicate. . . . I thought of the Network as a place where I could talk about my day with a sympathetic group of people. (JM, pp. 3, 7)

Electronic computer networking among beginning teachers encouraged discussions and interactions among the novices that offered emotional and personal support. Beginners gave high marks to the network's ability to provide moral support and reported that it reduced the sense of isolation and loneliness that is typical of many beginning teachers. Also, participants found the network to be a safe, nonevaluative environment in which they could discuss their feelings and situations with candor and without fear of appearing weak to their

[8] All participant names have been changed in this article to preserve confidentiality. In addition, network messages are transcribed verbatim.

Table 1

How Effective Was the Network in Helping You?

Objective	(n = 28)	Mean Response
Receive moral support		5.77
Develop a broader perspective on teaching		5.60
Keep in touch with friends		5.21
Reflect on philosophy of education		4.93
Share teaching techniques		4.68
Improve classroom management		4.42
Get help with lesson and curriculum planning		2.89

Note: 1 = least effective, 7 = most effective

supervisors or colleagues. However, there are elements of support that the network cannot provide.

Limitations to Support

Clearly, certain aspects of support that are enhanced by on-site collaboration cannot be reproduced by an electronic network. For example, direct interaction with another human being cannot be replaced by a machine. Compassionate looks, deep sighs, and other forms of "body language" that often help to tell a more complete story do not translate well on a computer screen. There are other nonpersonal limitations as well. For instance, extensive information about an individual teaching site cannot be conveyed effectively on a network that has members in multiple teaching situations. Information regarding school rules, norms, and philosophical orientations in practice at the school site or in a particular department are best communicated by an individual who resides at the site. Discussing the difference between his on-site mentor and the computer network, one participant observed:

> [My on site mentor] . . . had an opportunity that the Network, of course, doesn't have, in that he can see first hand what's going on, and also knows what's going on in the school at the same time. He also knows the kids because it is the kind of school that they go from nursery school . . . [he] knows the parents. . . . Also, [he] can read visual cues from my face and can know whether I'm upset. . . . So there's a whole lot more information that an on-site mentor can have that someone on the network wouldn't have access to. That can be good and bad, though. (JB, p. 16)

The Form and Structure of Support

The possibility that it is both good and bad to have an on-site mentor suggests a second frame of reference through which to explore the influence of an electronic network. By its nature and definition, the network offered an at-distance forum wherein beginning teachers could discuss "problems" they encountered in their daily work (Merseth, 1989a). Thus, an examination of the form and structure of problems presented and the ensuing development of solutions and strategies affords a different perspective on the nature of the messages offered by the novices. This also offers an opportunity to explore the influence of the multiple contexts. The remainder of this article presents data related to these issues.

The Theoretical Construct of Problem Solving

The study of problem solving represents a lively field of research, populated by cognitive scientists, social theorists, management experts, and educational researchers. One of the best known conceptualizations of problem solving is Simon's (1977) three-staged process of intelligence, design, and choice. In this view, intelligence represents both the

recognition that a problem exists and the articulation of what the problem is. A problem is defined as a situation where a gap is perceived to exist between what is and what should be (Van Gundy, 1988).

Simon's (1977) second stage of problem solving is design, wherein the problem is analyzed and solutions are developed. This stage follows the convergent process of problem identification and includes the divergent generation of multiple hypotheses, analyses, and possible actions. The final stage of problem solving is the stage of choice. In this stage, Simon uses the concept of choice to capture the process of resolving the problem through the selection of an appropriate hypothesis and the implementation of concomitant action.[9]

In addition to identifying stages of problem solving, those who study this process also classify dilemmas along a continuum ranging from well-structured problems such as puzzles with solutions to ill-structured problems that are more "amorphous dilemmas, open to multiple solutions" (Luszcz, 1989). In education, practitioners typically are confronted with ill-structured problems wherein actions to resolve a dilemma may be unclear (Lampert, 1985). And, to further complicate this stage for educators, once an action has been taken, the criteria by which to evaluate the success of the action may not be well defined (Lee, 1989).

An important aspect of problem-solving research is the belief that problem-solving stages are not independent of each other. In particular, much of the research in mathematical problem solving, for example, stresses that the definition and formulation of the problem is integral to the subsequent problem-solving stages (Brown and Walter, 1983). Clearly, the definition of the problem bears great influence on the solution. And closely related to the importance of problem formulation is the view that the context of a problem plays a key role in its definition (Simon, 1977; Sinnott, 1984). In the field of education, the importance of context has received recognition in recent educational research on teaching and teachers' thinking (see, for example, Doyle, 1977 or a synthesis of this research by Cazden, 1986).

The First Phase of Problem Solving: Problem Formulation

The BTCN offers a unique window on the formulation of problems by beginning teachers as well as an interesting example of the influence of context on problem definition. Due to the structure of the network, participation was voluntary. If participants wanted advice about a particular dilemma, they had to ask for it. Because requests for help were initiated by the novices, this compelled the novices to define for themselves and others the nature of the problem or dilemma. Referring to this phenomenon, one participant observed:

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[9]For readers interested in further information about problem solving, please see Kingsley and Gary, cited in Sinott, 1984; Shulman, 1965; Van Gundy, 1988.

> In order to ask for help, you have to halfway help yourself in order to describe what you want help with. . . . If you are going to ask for help, you have to define what your problem is. (JB, p. 17)

Because the network connected individuals in geographically diverse settings and without an initial understanding of the teaching environments of other members, all information about teaching context was supplied through the electronic network. Thus, in order to present a problem, the novices not only had to formulate and define the problem, but they also had to provide important information in their messages for others who were not situated at their teaching sites. In defining an individual problem, the nature of the network required that novices focus on their own contexts and decide what contextual factors were important to the problem definition. Discussing this, one network participant observed:

> When you have to tell people what they should consider in order to help you, you have to decide for yourself what's important for your situation. So it's almost a handicap that helps in a way. It makes you more reflective. (JB, p. 17)

Beginners who rely exclusively on on-site mentoring programs for advice and counsel may not have as many opportunities as those on the network to reflect and articulate their interpretations of the influence of local context. In on-site mentoring programs, mentors often know the student or issue in question. In this instance, it is the mentor's definition and assessment of the problem that becomes the operating paradigm. The mentor tells the novice what to do. While this often is efficient and effective, it can rob the novice of the opportunity to gain valuable experience and skill in problem identification and diagnosis. And, it is conceivable that the novice who has not defined the problem for him or herself may not have learned how to identify the characteristics of the dilemma should it occur again when a mentor is not available.

An excerpt illustrating the articulation of a problem and its related context by a novice teacher follows:

> msg. no. 609 filed 10:21 PM Oct. 19, 1987
> to: latest
> from: Linn
> re: a problem
>
> I have been going through a problem with a student for the past 4 days, and would like to know what other people would have done. I have a student from a very strict ethnic family. They feel that girls (this is their daughter) should not be out in public until they are 18, which includes even talking to a boy.

She is rarely allowed to go out to a movie, and spends all of her time at home on schoolwork. When she is done with her assignments, her father tries to supplement her work with some of his own choosing. Basically, they try to monitor her every moment and do not allow her any privacy.

This girl came up to me last Thursday in a panic explaining that she had gotten herself into some trouble and needed some help. She had gone out with a few friends after school for a pizza, and when she got home late (5:00) her mother was furious. The girl lied that she had been at school all that time with her math teacher (me) getting extra help. Going out with friends after school was forbidden, and she didn't want to get in trouble. Anyway, her mother didn't believe her, and told her she was going to call the teacher to check. The girl wanted me to lie to her parents and tell them that she was with me.

I told her that I couldn't lie for her, but that I would be glad to help in any other way that I could--explain to her parents that I had spoken with her and she was very sorry--meet with her parents--talk with her about how to deal with her parents reaction etc. But she continued to beg. After about 20 min. I thought she understood that I would not lie to her parent.

Later I went down to my mailbox and found a 4 page letter pleading for help, and again, begging me to lie for her. The letter really concerned me. She seemed really desperate.

So, I spoke to her counselor about the situation. We arranged that I would not return her mother's phone call (in the meantime she had called and left a message) until Monday (today) so that she could meet with her counselor and discuss how to deal with her parents reaction. I told her about the arrangement, and she agreed to meet with the counselor, so I didn't call until this morning.

I reached her father who was confused because he thought I had sent a letter home explaining that his daughter had been with me Thursday (whoops, it was Wednesday) afternoon.

I had a 25 min. conversation with the girl this afternoon about the whole situation. She kept insisting that I MUST lie for her, that she would get in "SO MUCH" trouble, that I didn't understand the pressure she was under, that her parents were unreasonable (which I happen to believe they are--although I also believe that she needs to learn not to lie, forge letters etc.).

So that's where I am. The mother is supposed to call me back to clear up the situation about the note. I know they are going to hit the roof. (rightfully so) but I worry at the severity of the punishment they may impose upon her. She has been grounded for two months for a rather minor offence last week.--no phone calls, no friends over, no going out at all (except for school). What are they going to do now? And why is she so desperate that she'll go through all this just to cover up going out with a few friends after school for 2 hours? I

> feel like I have betrayed her, and yet I really believe she is in the wrong and created this problem for herself.
>
> As my headmaster said, "And you thought you were going to teach math!"

Potential Bias

While it is important for novices to gain skills in problem identification and diagnosis, doing so "at-distance" has some significant drawbacks with regard to bias and informed representation. In this medium, there are no safeguards that the characterization that the beginner presents to the network is accurate or appropriate to the situation. Beginners may easily focus on the wrong variables, the wrong issues, and the wrong elements of a particular dilemma. To some extent, however, this problem is mitigated by many individuals closely reading the material and asking questions. As one participant observed,

> On the Network sometimes you really can listen. Because you're reading the words . . . you're not thinking about what the person is wearing, or any of those other things. It's just coming out in words. It's sort of a more objective approach to conversation. (JM, p. 11)

If participants are inconsistent or incomplete in their presentations and interpretations, others are likely to send messages asking for more information or questioning certain descriptions.

The Second Stage of Problem Solving: Design

Beyond the influence of the network on problem formulation of participants, the medium also had a strong influence on the design and construct of general considerations, strategies, and solutions. Initial topics or questions emanating from the experiences of novices in specific teaching environments stimulated discussions and conversations. Following the presentation of a problem or a request for help, immediate responses typically referred with great specificity to the original request. Sometimes these responses would occur within a few days or they would appear in the midst of a later discussion when the reader, who had not participated for some time, sent his or her first response to the initial message.

As time and the ensuing discussion progressed from the original stimulus, however, the nature of the subsequent contributions to the flow of discussion by network members changed. Rather than specific, "If I were you, based on my experience in my setting, I would do . . . ," contributions frequently moved to a more philosophical or policy-related conceptualization of the problem.

This tendency to generalize may be attributed to at least two factors. First, the initial responses to the original stimulus message were usually multiple and were framed in the sender's context. Reading these multiple messages with differing points of view and from different contexts instilled an awareness for the novices of the variability in teaching. And, as the discussions continued, this awareness of the multiple contexts created a new, more generalized context for the ensuing discussions. Second, the increased awareness of the range of contexts fostered abstraction, rather than specificity, in the contributions. The representation of multiple contexts on the network made generalization a natural consequence for the continuing conversations.

In order to examine this phenomenon in the second stage of problem solving, the following section will consider both the nature of initial responses to a request for help and the subsequent generalization of conversations to a broader, more abstract exchange.

Initial Responses

In the following example, a beginning teacher initiates a discussion about classroom management with a question about his actions in his classroom:

> msg no. 1263 filed 6:11 PM Dec 3, 1987
> to: manage
> from: tom in Massachusetts
> re: Chattering in class
>
> Wow, am I discouraged. After my last class today I realized that in an effort to keep open communications and a pleasant atmosphere, I have let chattering get totally out of control in all of my classes! My reaction, after being totally exasperated and finding the "please stop talking" or going and standing next to them to be only very short term (less than 5 minutes) effective . . . is to change the seating arrangements. . . . Then, I will start giving detentions for talking in class. I would love to think of a way to change their behavior by rewarding them for good behavior (after all, I am a Psychology teacher). . . . Does anyone have any ideas/suggestions/dictums/rules??

Within two days, this message stimulated six responses, all from other beginning teachers. Briefly, these included the following:

> msg no. 1266 filed 9:02 PM Dec 3, 1987
> from: dick in Arkansas
> to: manage
> re: Chatting in class
>
> My experience . . . is that there is no alternative to just plain being tough and making it clear that the noise will subside or the noisemakers will suffer painful

consequences (e.g., phone calls and letters to parents, detention, suspension, etc.). [My school] works with a system of points which trigger successively more serious disciplinary actions. Students know how many points they have accumulated so they are on notice as to impending consequences of their disruptive actions. . . . Not perfect but it seems to work pretty well here.

msg no. 1267 filed 9:13 PM Dec 3, 1987
from: jane in Massachusetts
to: manage
re: chatters and rewards

Tom, if you are into behavior mod. you can give points for kids who are well behaved. Personally, i don't love the idea, but i have used it. . . . i had a class of "chatters" and changing their seats worked very well. The other thing you could try (although its rough) is to just continue class while they chatter and hold them responsible for all the material covered that day. You can start giving quizzes (surprise ones) in the middle of class to see who knows whats going on. I tend to have the same problem as you because I'm very relaxed with the kids, but i've gotten to the point where, when it gets too noisy I just stand in the front of the room and look at them and wait for them to be quiet. What happens now is that they ask each other to be quiet. Its nice.

msg. 1271 filed 9:52 PM Dec 3, 1987
from: jack in Illinois
to: manage
re: Pals and kids

I try my best to make the subject interesting enough to the point where kids get interested in the topic, I try to show the neat nature of the math. Once in a great while something catches someone's eye and I have a convert to math. Schools run on the assumption that we must FORCE students to BE in the CLASS and they MUST pay ATTENTION negate the possibility that you will EVER have the students displaying any sort of self motivation through their own interest. . . . Luckily, I teach in a private school where I can get away with opinions such as these.

msg. 1275 filed 4:13 PM Dec 4, 1987
from: linn in Massachusetts
to: manage
re:

I don't know if your school allows this, but my department head suggested that I send a disruptive kid out of the room for a few minutes and tell him/her to come back in when he thinks he can behave like a high school student instead of an elementary school [student]. He suggested this for a student who is particularly unruly and demanding of attention. I haven't tried it yet, but he

(the dept. head) said it worked well for him in a similar situation.--It does get him out of the center of attention--I would consider making the kid stay after school for the amount of time he's out of the classroom to make up the time he missed so he wouldn't just wander the halls and create problems for other people.

msg no. 1276 filed 6:45 PM Dec 4, 1987
from: rob in Massachusetts
to: manage
re: principal directives

I have found this year that the classes in which I get along well with the students run the most smoothly because they like and respect me enough not to want to hurt my feelings. I do have difficulties with one class in particular, however, and I don't think it is just a coincidence that I never really hit it off well with most of the kids. I am at my most "disciplinarian" with those that class, but they behave the most poorly. . . . On the subject of getting kids to learn what they don't want to learn, I just had a fantastic discussion today with my freshman world history class. . . . I began the discussion by writing on the board in giant letters: "WHY ARE WE HERE?" I was amazed by the discussion it provoked . . . we began to discuss why they were in school, which they all professed to hate. . . . It was really rewarding to see them leave the class feeling more positive about going to classes they disliked . . . because now they could see a reason why it might help them and be important to them. I think it's important every now and then to explain to the kids exactly why they are doing what they are doing.

msg no. 1284 filed 1:14 PM Dec 5, 1987
from: jamie in Massachusetts
to: manage
re: discipline, pals, and dinosaurs

First, I should point out that my situation is different from that of most. I'm working in an alternative school where my biggest class consists of seven students, many of whom are really big discipline problems. . . . In terms of chatter and disruption, I think that tossing someone out of the class is at the extreme end of responses, but that it should definitely be employed when the situation warrants it. . . . In terms of general chatter . . . I think the idea of stopping is a good one, I used it both as a substitute teacher and during my student teaching with a good measure of success. It can also be varied by timing the duration of the noise. Looking at the clock gives students the very real indication that you think time is being wasted; a realization that can be reinforced by having the class make up the wasted time after school . . . this really cuts down on the amount of time wasted because students quickly see the direct relationship between their chattering and the length of their time

> after school. However, it can lead to an awful lot of clock-watching--itself a waste of time--with particularly chatty classes.

These initial responses to a concern about "chatters" illustrates the frequent reference to the sender's teaching environment. In providing these referents, the novices qualified their advice and noted that it was specific to their personal experience and context. For example, in Linn's message she states, "I don't know if your school allows this, but . . . " while Jack is aware of his private school influences. In reflecting on her contributions, one participant noted, "I always tried to put in my advice on what I would do, or sympathize with the person" (JM, p. 8). Lacking a common teaching context, the network caused the novices to be particularly sensitive to their own situations.

Disparate initial responses from multiple contexts reinforced an awareness that teaching experiences and environments often differ. One novice, who taught in a wealthy private school, spoke of sending advice to another member who taught in a poor, rural district:

> I tried to be pretty careful about giving advice that I thought might not work in another setting. . . . I also tried to avoid casually saying some of the advantages that I had. Like if I was on the Network, I wouldn't casually tell Dick in Arkansas to just pull out his high tech MacIntosh computer and his overhead projector and lead the class. . . . You had to recognize that you had to try not to give them answers that weren't accessible. (JB, p. 23)

The representation of multiple settings also helped the participants gain a broader perspective on education. For example, one participant stated that the presence of multiple settings drove

> the discussion to things that were more common than . . . adjusting to whatever the set-up is. . . . Everyone has a tendency to feel that your own situation is very unique, and on one level it is, yet on another level the problems are universal. (ME, p. 11)

The multiple experiences also extended the practical knowledge base of those on the network. One teacher observed that the

> memories of what went on in the network keep bubbling up [for me now]. It's not that I can say, well, when this happened to me 28 years ago . . . instead, I've got 50 different stories of beginning teachers that I can refer to. . . . There's not much that you can run across that I don't have at least a memory of someone else having [on the network]. (JB, p. 26)

The at-distance nature of the network with teachers located in different geographic locations combined with the fact that they taught different subject matter and different grade levels in both public and private schools caused the beginners to be keenly aware of their own teaching situations and personal philosophies about teaching.

Generalization of Discussions

The focus on the second phase of problem solving in network messages--the creation of possible solutions and strategies--highlights a second characteristic of network discussions. Often, after an initial round of specific responses to an individual problem, the discussion moved to generalize the original issue or question to a higher level of abstraction. A selected sample of messages that followed the earlier example about "chatters" (initiated on December, 3, 1987, and included in pages 14-15) illustrates this point.

> msg no. 1281 filed 3:21 AM Dec 5, 1987
> from: grant in New York
> to: manage
> re: forcing kids to pay attention and learn
>
> I think the real issue is to find ways to produce learning successes for the kids in the classroom, and then motivation will help take care of some of the discipline or management problems.

> msg no. 1378 filed 5:27 PM Dec 8, 1987
> from: dick in Arkansas
> to: manage
> re: classroom order
>
> A lot of this discussion has been on order and only a little of it on what that order (or degree of order) should serve. Some messages back, John said something about engaging individual students in the excitement of learning. I am skeptical that this can be done very well or very often in the midst of chaos. I also question the conclusion that we can't or perhaps even shouldn't press reluctant students into regular patterns of enforced learning--where they may stumble on something exciting. I do agree with John that order isn't what teaching is all about. Once you have attention, you have to have yourself ready to teach in ways which engage the students in learning in diverse ways with diverse and often changing levels of interest.

> msg no. 1382 filed 9:29 PM Dec 8, 1987
> from: andrew (a teacher educator)
> to: manage

It seems to me that looking for [the love of the subject] is a dead end. I prefer as the reason for teaching [that] students learn in order to own the subject matter. We as teachers . . . can assist students in gaining that ownership. . . . There is certainly no possible way this will reach all students. . . . These resistant students aside, however, I believe that a classroom context with [this] as an operating dynamic has a very good chance of gaining the attention of the majority of the students.

msg no. 1393 filed 11:53 PM Dec 8, 1987
from: jack in Chicago
to: manage
re: Enforced learning

I disagree that there is such a thing as enforced learning. . . . Nor do I write off students because they are not interested. I write off students UNTIL they are interested. . . . More and more I find I get some of the best results when it is obvious to the student that there is a class going on here and if they chose not to participate they will get left behind. . . . But I have a lot trouble about the hidden messages we send about the value of education, the morals of coercement, and lack of respect for self-determination when we use words like "enforced education."

msg no. 1472 filed 5:50 PM Dec 13, 1987
from: grant in New York
to: manage
re: compulsory "education"

I know that I did well in school because I enjoyed it. . . . Quite a few of my students have expressed opposite sentiments . . . they are into passive resistance; little or no work, little or no effort, poor attendance. . . . Why torture poor students into coming to school when the only result is to turn them off to school, and perhaps to learning altogether? Perhaps one answer is to make high school optional. . . . This seems sort of dangerous to me, teaching in one of the poorest school districts in the country, but some kids are in effect doing it already, either by being truants or by working at a couple of jobs and sleeping through classes.

msg no. 1532 filed 8:01 PM Dec 15, 1987
from: jane in Massachusetts
to: manage
re: education

[Tom] mentioned something i feel is very significant: his wrestling coach was the teacher who had such a great impact on him because of his ability to relate to [Tom] and make [Tom] feel successful and positive. . . . It is not so much the algebra, biology, and writing that we teach, it is the feeling of self-worth

> and confidence. . . . Anyway, i think that is something i really like about teaching middle school--as a teacher you are "allowed" to stress those things. The academics are also important; i guess you just can't have one without the other.

The flow of conversation from a question about classroom management (msg. no. 1263, December 3, on page 14) to a broader consideration about the purposes and policies of education was typical of the network. This particular conversation turns to a more philosophical nature when Dick states: "A lot of this discussion has been on order and only a little of it on what that order (or degree of order) should serve." The conversation moved from specific action recommendations for Tom about his "chatters" to more generic, less context-specific considerations for a broader audience. Participants seemed ready for the change; indeed, no further specific comments were offered for Tom's benefit. From Chicago, Jack pushed the conversation further away from "chatter consideration" by questioning "enforced education" while Grant, in "one of the poorest districts in the country," wondered about "optional" high school attendance. The conversation moved to another level when Jane states: "It is not so much the algebra, biology, and writing that we teach, it is the feeling of self-worth and confidence." This comment generated a lengthy discussion of self-esteem for another two weeks on the network.

Engaging in conversations and discussions on the network about teaching had the dual effect of making beginners keenly aware of their own particular teaching experience as well as inducing a broader perspective of education. The give and take of the exchanges, the multiple perspectives of the individuals, and the wide range of experiences helped the beginners conceptualize the meaning of his or her situation within the larger context of being an educator. It stimulated debate, discussion, and reflection.

The Third Stage of Problem Solving: Choice

Simon's (1977) third stage of problem solving relates to the convergent process of making a choice and implementing it. Unfortunately, the network only occasionally offered an opportunity to observe this stage of the problem-solving process in beginners. In the network model of assistance, conversations were open and could be entered or exited at any time. Unless the novices chose to share "how the story came out" on the network, the problem resolution stage was invisible to those external to the teaching site. Network participants had an opportunity to assess the appropriateness of the offered advice with respect to their particular situation and to heed or ignore the advice. This characteris... of the network support differs from on-site mentoring programs because of its passivity. In individual mentoring or coaching situations much closer supervision and follow-up is possible.

Conclusion and Other Research Topics

This discussion of the effect of a computer network on the form and substance of strategies developed by first-year teachers represents a first step in a long line of research. Current research includes a content assessment of the topics the beginners elect to discuss and a more detailed analysis of how they frame these topics (Merseth, 1989b; Cutler, 1990).

Another area of inquiry that preliminary analysis suggests will be particularly productive centers on the ability of the network to encourage reflection in beginning teachers. Richert (1988) suggested that reflection in teachers is fostered by the provision of time, a safe context, and the opportunity for conversation. The network meets these conditions and, in particular, encourages thoughtful contributions because of its structure and pace. As one novice stated, "The network is like having a slow-motion conversation" (JB, p. 19).

The research reported in this article examined the influence of an interactive computer network on the form and substance of advice that beginners give to each other. It examined two stages of problem solving--problem formulation and solution generation--among novice teachers. In particular, it explored the impact of multiple contexts, as represented on the network, on the problem-solving activities of the novice teachers. In addition, the research documented the extent to which a technical system based on the electronic transfer of text can provide emotional support to beginners who are located in diverse geographic settings. The study provides valuable information about the impact of technology on induction programs for beginners in the teaching profession.

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